C64 – Control Port Switch & Rapid-Fire Rev. 1

Functional Description

J1 connects top Control Port 1, J2 to Control Port 2. The switching functionality to the four direction channels (JOY0…3) of the joystick is realized in IC1 and IC2. A HIGH level on signal PORT1 switches on the analog switches of IC1 to the active state, while IC2 is switched off. The joystick signals are available on J1 (JOYA0…3).

A HIGH level on signal PORT2 switches IC1 off (PORT1 is the inverted PORT2), while IC2 is switched on. JOY0…3 are now present on JOYB0…3 (J2, Port 2).

The analog signals POTX and POTY are switched with the analog switch IC2. Q3 and R1 invert the signal PORT2. A HIGH level on the resulting Signal PORT1 is switching POTX to POTXA and POTY to POTYA on control port 1.

A HIGH level on PORT2 switches POTX to POTXB and POTY to POTYB (control port 2).

Both Fire signals (FIREA and FIREB) are generated by the micro controller module M1, a Pro Micro. Q1 and Q2 serve as switches. HIGH pulses on the signals FIRE1 and FIRE2 respectively issue LOW pulses on FIREA and FIREB respectively. LOW means, that the fire is active.

/LED1 and /LED2 should indicate the active control port. /SWITCH and /RF\_ON are active LOW signals from external switches, the purpose is switching between channels and switching on/off the rapid-fire function.

The FIRE signal is issued by the connected joystick. It is active LOW. The controller is supervising this signal and issuing the HIGH level or pulses on FIRE1 or FIRE, depending on the rapid-fire option is switched off or on and the port, which is selected.

The signal RFSPEED is a voltage level depending on the position of the connected “Speed” potentiometer. The controller is converting it to digital internally.

J7 carries the I²C bus signals of the controller and supply voltage (+5V) and ground. The purpose is connecting an I²C bus LCD or OLED display. This can serve to indicate the state and rapid-fire rate.

The twin diodes D1…D7 serve as a basic protection of the joystick input. The digital joystick inputs are connected to 10k pull-up resistors.

IC4 is not necessarily populated. It is an EEPROM and can be used to store parameters that should be non-volatile. It is only required, if the scrip for the Pro Micro supports this feature.

The circuitry around Q5 is driving a piezo buzzer. It is an option and only required, in case the firmware (script) for the Pro Micro supports this feature.